CLAIMS

1.   An internet packet comprising a header field, the header field including a field identifying a source address of the internet packet, a field identifying the destination address of the internet packet and a next header field identifying whether an extension header follows the header and a type of the extension header, wherein the header field identifies that the extension header includes a hop-by-hop extension header, the hop-by-hop extension header including a router alert option header indicating that the hop-by-hop extension header is optional for a router to read, and a value field indicating that the remainder of the hop-by-hop header is provided for a gateway support node of a packet radio network, wherein the remainder of the hop-by-hop extension header includes a field providing a home address of a mobile node.

2.   An internet packet as claimed in Claim 1, wherein the router alert option header includes a first field indicating that the hop-by-hop extension header is optional, a second field indicating the hop-by-hop option type number, and a third value field, the value in the third value field indicating that a fourth field provides the home address of a mobile node.

3.   An internet packet as claimed in claim 2 or 3, wherein the first field of the router alert option header is provided as a relatively short field with the effect that a time for a router to read the first field is reduced with respect to a requirement to read all data in the hop-by-hop extension header.

4.   An internet packet as claimed in Claim 3, wherein the first field comprises three bits.

5.   An internet packet as claimed in Claim 4, wherein the three bits are all zeros.

6.   An internet packet as claimed in Claims 3, 4 or 5, wherein the second field of the router alert option header indicating the hop-by-hop option type comprises five bits set to a value of five.

5   7.   An internet packet as claimed in any preceding Claim, wherein the internet packet is a IPv6 internet packet.

8.   An internet packet as claimed in any of Claim 1 to 7, wherein the home address of the mobile node corresponds to the source address of the mobile node when
10   associated with a home network when an internet protocol session was initiated.

9.   An internet packet as claimed in any of Claims 1 to 7, wherein the home address of the mobile node corresponds to the destination address of the mobile node associated with a home network when an internet protocol session was initiated.

15

10.   An internet packet as claimed in any of Claims 1 to 9, wherein the packet radio network is a General Packet Radio Service network, the information for the gateway support node being provided for a Gateway GPRS Support Node of the GPRS network.

20

11.   A gateway support node (GGSN) operable to provide an interface between an external packet data communications network and a packet radio network, the packet radio network providing a plurality of packet data bearers for communicating the internet packets with nodes attached to the packet radio network,
25   each of the packet data bearers being defined with respect to a source home address of nodes communicating the internet packets, the gateway support node (GGSN) being operable upon receipt of the internet packet according to any of claims 1 to 10,

to detect that a next header field of the internet packet includes a hop-by-hop extension header, and
30   to detect a router alert option header in the hop-by-hop extension header, and a value field indicating that the remainder of the hop-by-hop extension header is provided for the gateway support node, and upon detecting the value field indicating

that the remainder of the hop-by-hop extension header field is for the gateway support node,

to recover information from a field provided in the remainder of the hop-by-hop extension header for use in controlling egress and/or ingress of internet packets to the packet radio network in accordance with the information, wherein

the gateway support node is operable

to control ingress of internet packets from the external communications network to the packet data bearers of the packet radio network, by

detecting from the information field provided in the remainder of the hop-by-hop extension header a source home address of a mobile correspondent node communicating the internet packets,

using the home address to identify the packet data bearer for communicating the internet packets to a correspondent node attached to the packet radio network, and

allowing ingress of the internet packets to the identified packet data bearer.

12.   A gateway support node as claimed in Claim 11, the gateway support node being operable

to allow ingress of the internet packets if either the address in the source address field of the internet packet or the address provided in the field in hop-by-hop extension header for the gateway support node corresponds to a packet data bearer.

13.   A gateway support node as claimed in Claim 11 or 12, the gateway support node being operable

to perform egress packet filtering in accordance with a destination address of the internet packets received from the plurality of packet data bearers, egress of the internet packets being allowed for internet packets having a legitimate destination address, and upon receipt of the internet packet according to any of Claims 1 to 10,

to detect from the information data provided in the hop-by-hop extension header field for the gateway support node a destination home address of a mobile correspondent node which is to be the destination of the internet packets, and

to allow egress of the internet packets if the gateway support node recognises the destination home address as a legitimate home address.

14.   A gateway support node as claimed in Claim 13, the gateway support node being operable to allow egress of the internet packets if either the address in the destination address field of the packet or the address provided in the hop-by-hop

5   extension header for the gateway support node is a legitimate destination address.

15.   A gateway support node as claimed in any of Claims 11 to 14, wherein the gateway support node is operable as a Gateway GPRS Support Node (GGSN), according to the General Packet Radio System standard.

10

16.   A packet radio network operable to communicate internet packets between an external packet data network and nodes associated with the packet radio network, the packet radio network providing a plurality of packet data bearers for communicating the internet packets to and/or from the nodes attached to the packet

15   radio network, the packet radio network including a gateway support node as claimed in any of Claims 11 to 15.

17.   A packet radio network as claimed in Claim 16, wherein the packet radio network is operable in accordance with the General Packet Radio System

20   (GPRS) standard, the gateway support node being a Gateway GPRS Support Node (GGSN).

18.   A method of operating a gateway support node to interface between an external packet data communications network and a packet radio network, the packet

25   radio network providing a plurality of packet data bearers for communicating the internet packets with nodes attached to the packet radio network, each of the packet data bearers being defined with respect to a source home address of the nodes communicating the internet packets, the method comprising

        receiving an internet packet according to any of claims 1 to 10,

30   detecting that a next header field of the internet packet identifies that an extension header includes a hop-by-hop extension header,

detecting a router alert option header and a value field in the hop-by-hop extension header indicating that the remainder of the hop-by-hop header is provided for the gateway support node, and upon detecting the value field indicating that the remainder of the hop-by-hop extension header field is for the gateway support node

5   recovering from a field provided in the remainder of the hop-by-hop extension header information for use in controlling egress and/or ingress of internet packets to the packet radio network in accordance with the information,

wherein, the controlling the ingress of internet packets from the external communications network to the packet data bearers of the packet radio network in

10 accordance with the information, includes

detecting from the information provided in the remainder of the hop-by-hop extension header field a source home address of a mobile correspondent node communicating the internet packets, using the home address to identify the packet data bearer for communicating the internet packets to a correspondent node attached to the

15 packet radio network, and

allowing ingress of the internet packets to the identified packet data bearer, and otherwise dropping the internet packet.

19.   A method as claimed in Claim 18, the method comprising

20   performing egress packet filtering in accordance with a destination address of internet packets received from the plurality of packet data bearers, egress of internet packets being allowed for internet packets having a legitimate destination address, and upon receipt of internet packets according to any of Claims 1 to 10,

detecting from information provided in the remainder of the hop-by-hop

25 extension header field for the gateway support node a destination home address of a mobile correspondent node which is to be the destination of the internet packets, and

allowing egress of internet packets if the gateway support node recognises the destination home address as a legitimate home address.

30   20.   A signal representing an internet packet according to any of claims 1 to

10.

21.   A signal bearing medium, the medium bearing the signal according to
Claim 20.

22.   Use of an IPv6 Router Alert option header for communicating a source
5   home address of a mobile node to a Gateway GPRS Support Node, the router alert
option header including a field indicating that the router alert option header containing
the source home address is intended for the Gateway GPRS Support Node.

23.   A computer program providing computer executable instructions,
10   which when loaded on to a data processor configures the data processor to operate as a
gateway support node as claimed in any of Claims 11 to 15.

24.   A computer program having computer executable instructions, which
when loaded on to a data processor causes the data processor to perform a method
15   according to any of Claims 18 or 19.

25.   A computer program product having a computer readable medium
having recorded thereon information signals representative of the computer program
claimed in Claim 23 or 24.

20